

AQA Computer Science A-Level
4.9.1 Communication
Past Paper Mark Schemes

January 2010 Comp 2

8	(a)		Set of rules/agreed signals/agreed codes (for data exchange between systems) R instructions	1
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January 2011 Comp 2

10	b		A set of (agreed) rules / codes / signals (for data exchange between systems); Agreed standard for communication between computer systems;	MAX 1
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June 2011 Comp 3

10	(a)		Number of signal changes per second // rate at which signals can change; A voltage changes for signal changes as BOD	1
10	(b)	(i)	Each signal level/signal change represents two bits (of data)/more than one bit (of data) // channel supports four/more than two different signal levels/voltages // use of modulation/coding technique e.g. phase modulation NE Send more than one bit at a time Must be clear that there are more than two signal levels	1

June 2012 Comp 3

4	(a)		Greater the bandwidth, the higher the bit rate // positive correlation // (directly) proportional; Bandwidth must be at least $2w$ Hz where w is the bit rate in bits per second;	MAX 1
4	(b)		Time delay between the moment something is initiated and the moment its effect begins A time delay between signal being transmitted and arriving A time taken for transmitted data to arrive at the receiver A lag for time delay NE delay in transmission, transmission time	1
4	(c)		Bit rate is double/twice baud rate // Baud rate is half bit rate; A "It" is double; A 2:1	1

June 2013 Comp 2

4	(a)	<p>A set of rules/regulations (to allow communication between devices) // set of agreed signals/codes for data exchange;</p> <p>NE a rule // a regulation // a signal // a code NE instruction(s)</p>	1
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June 2017 AS Paper 2

08	1	<p>2 marks for AO1 (knowledge) and 2 marks for AO1 (understanding)</p> <ol style="list-style-type: none"> 1. Parallel communication requires more wires (and hardware); <ul style="list-style-type: none"> • Higher cost • More difficult to manage when setting up the system • More difficult to repeat/switch 2. Parallel communication needs the data to be kept synchronised across wires / risk of data skew over long distances; <ul style="list-style-type: none"> • More chance of errors • Limiting factor on transmission speed (as problem worsens at higher speeds) • Limiting factor on cable length 3. Parallel communication carries the risk of crosstalk between wires; <ul style="list-style-type: none"> • More chance of errors • Limiting factor on transmission speed (as problem worsens at higher speeds) <p>2 marks for AO1 (knowledge) for making any two of points 1,2,3 above – 1 mark per point.</p> <p>2 marks for AO1 (understanding) for making any of the bulleted points above and linking the points to an associated knowledge point – 1 mark per point. Note that only 1 mark can be awarded for a particular understanding point (e.g more chance of errors) even if it is made more than once and connected to different knowledge points.</p> <p>A. points made in reverse, for example serial communication has less chance of errors because it uses fewer wires so cross talk does not occur.</p>	4
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08	2	<p>Marks are for AO1 (knowledge)</p> <p>1 mark for each term defined</p> <p>[Bit rate] The number of bits that can be sent/received/transferred in one second/unit of time // the frequency at which bits can be transmitted/transferred;</p> <p>R. Unexplained examples</p> <p>[Latency] The delay between an action being instigated and its effect being noticed;</p> <p>A. time delay between signal being transmitted and arriving A. time taken for transmitted data to arrive at the receiver A. lag for time delay NE. delay in transmission, transmission time</p>	2
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June 2017 Paper 2

03	1	<p>Mark is for AO1 (understanding)</p>	1
		3;	
03	2	<p>Mark is for AO2 (apply)</p> <p>1500 (bits per second); A. $3 * 500$ A. Value given in response to question part 3.1 multiplied by 500.</p>	1

03	3	<p>Mark is for AO1 (understanding)</p> <p>B; R. If more than one lozenge shaded.</p>	1
03	4	<p>All marks AO1 (understanding)</p> <p>Data skew might occur if parallel communication used; A. Eliminates risk of desynchronisation (between data signals) A. Bits transmitted <u>simultaneously/together</u> may arrive at different times NE. Bits will not arrive together The longer the distance the higher the likelihood of data skew; To avoid problems of cross-talk // interference between individual wires; Hardware (for serial communication) is cheaper to manufacture // cheaper cabling (for serial communication which is more important over long distances); A. "Easier" for "cheaper" NE. Just statement that fewer wires required without expansion eg lowering cost NE. References to data being corrupted without further explanation eg data skew, cross-talk</p> <p>MAX 2</p>	2

June 2013 Comp 3

3	(a)	<p>Serial send one bit at a time / after each other whereas parallel sends multiple bits <u>simultaneously/at same time</u>;</p> <p>A. "data" for "bits" in the context of parallel transmission</p> <p>Serial uses a single wire/cable/path/line whereas parallel uses several/multiple wires/cables/paths/lines;</p> <p>R. answers that refer to multiple channels achieved by sharing bandwidth</p> <p><i>Both sides of point must be made.</i></p>	2
3	(b)	<p><i>Parity Bit: 1;</i></p> <p><i>Start bit, Stop Bit : Can be either 0 or 1, but must both be different to get mark;</i></p>	2
3	(c)	<p>Receiver and transmitter (clocks) do not need to be/are not (exactly) synchronised // transmission of data without use of external clock signal // receiver and transmitter clock only synchronised at start of/for length of transmission // start bit used to synchronise clocks of sender and receiver // data sent as soon as available rather than waiting for clock pulse/synchronisation symbol;</p> <p>NE data sent as soon as possible without waiting for receiver to be ready // receiver does not know when data will arrive</p>	1

Specimen AS Paper 2

04	3	<p>Marks are for AO1 (understanding)</p> <p>In coffee shop speed could be limited for each device that is connected // throttling; In coffee shop more clients connecting to one access point; In coffee shop connection to Internet might have less bandwidth; In coffee shop there may be more collisions;</p> <p>NOTE accept answers made in terms of home</p> <p>Max 2 marks</p>	MAX 2
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Specimen Paper 2

02	1	<p>All marks AO1 (knowledge)</p> <p>1 mark: Serial sends one bit at a time/after each other whereas parallel sends multiple bits <u>simultaneously/at same time</u>; A. "data" for "bits" in the context of parallel transmission</p> <p>1 mark: Serial uses a single wire/cable/path/line whereas parallel uses several/multiple wires/cables/paths/lines; A. serial requires fewer wires R. answers that refer to multiple channels achieved by sharing bandwidth R. unless both sides of a point are made.</p>	2
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02	2	<p>Mark is for AO1 (understanding)</p> <p>Parallel communication can only be used over short distances // distance between computer and peripheral too great to use parallel communication // data skew might occur if parallel communication used; To avoid problems of cross-talk // interference between individual wires; Hardware (for serial communication) is cheaper to manufacture; A. fast transmission rate may not be required; Max 1</p>	1
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02	3	<p>Mark is for AO1 (knowledge)</p> <p>Number of signal changes per second // rate at which signals can change; A. voltage changes for signal changes</p>	1
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02	4	Mark is for AO1 (understanding) Each signal level/signal change represents more than one bit (of data) // channel supports more than two different signal levels/voltages // use of modulation/coding technique eg phase modulation; N.E. Send more than one bit at a time Must be clear that there are more than two signal levels	1
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